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ABSTRACT

Over the years, situated and observational learning has given way to mass teaching and theoretical learning based on prose information. Even though schools have produced many successful professionals, they often fail to address individual differences in learners and encourage competition rather than cooperation between learners. As a result, many students, particularly those of low ability, have built negative attitudes toward learning and even dropped out of school. Instructional technologies may help make learning more enjoyable for all students. The multimedia-based computer, which combines many of the capabilities of projectors and videocassette players, can deliver information in varying forms and accommodate a diversity of learning styles. In addition to earlier studies that have been done on the characteristics of the motivated student and the differences between extrinsic and intrinsic motivation, studies are now appearing on the influences of computerized presentations on the learning process. One study of 70 fourth-graders being taught a lesson on Newton's laws of motion found that computer animated visuals hold intrinsically motivating appeal for learners. Given a choice, most students chose to return to animated graphics rather than static graphics. Another study revealed that the use of audiographics, or instructional images accessible on computers at various remote sites, significantly improves motivational and attitudinal levels. The results of a third study suggest that humor in computer visuals can also be valuable. Among other things, features designed to enhance the appeal of computer visuals should always support the learning content and the nature of the task, increase motivation, trigger imagination and inquiry, relate to attainable goals, and demonstrate real-world applications of knowledge. (Contains 16 references.) (BEW)

The Effects of Computer Visual Appeal on Learners' Motivation

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Introduction

Many years ago, learning was situated (Viau, 1994). A farmer, for example, would take his son to the field and teach him practically how to plant the seeds, weed the plants, and collect the crops. The son, in this learning situation, would have the opportunity to observe and model after his father, practice what he observed and learned, and get immediate feedback to correct his performance.

Eventually, schools and mass teaching started to emerge, especially after the invention of paper (Viau, 1994). Learning, consequently, shifted from the situated to the theoretical (prose information), and learners then did not have to go to the field in order to learn the acquired skills.

But, even though schools successfully produced professors, scholars, army lieutenants, and highly accomplished businessmen, they had, and will still have, their own inherent flaws (Toffler, 1974). To further explain, a typical school environment;

- does not adequately address the individual differences between learners,
- does not seriously consider the various learning styles of the learners,
- encourages competition rather than cooperation between learners,
- is ability- rather than achievement-oriented,
- uses the "carrot and stick" strategy to motivate learners rather than create intrinsically motivated learners, and
- delivers instruction mainly through one approach: teacher-led instruction.

As a result, many students, especially low-ability students, had lost self-confidence, lost motivation, lost interest, built negative attitudes toward learning, and/or dropped out of school (Toffler, 1974). The failure of these students concerned many educators as well as parents and pushed them to think of a way to improve the performance of the educational system.

Implementing technology in education was one of the steps taken to improve the educational system. During World War II, the military utilized the overhead projector, a technology which was designed to deliver mass instruction to a large number of troops (Saettler, 1990). The overhead projector, along with other technologies, such as the slide projector, opaque projector, film strip, and video, were eventually adopted in schools, since schools also deliver mass instruction. The most important features of these technologies is that they help deliver the instructional message in different forms: visual, audio, color, and animation. These features have helped teachers accommodate the differences in the learning styles of learners, and made learning more en-

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joyable (Heinich, Molenda & Russell, 1993).

Utilizing Computers in Instruction

The computer, as a relatively new technology in schools, has proved to be an effective teaching and learning tool, and it is also capable of delivering instruction in the forms of visual, audio, color, and animation (Lockard, 1987). Multimedia-based computers are capable of providing the functions and features of all the technologies mentioned above (slide projector, opaque projector, filmstrip, and video).

To list its technical capabilities, the multimedia-based computer nowadays can

- interact with a laser disc player to display analogue movies,
- interact with a VCR to display the content of a videotape
- run a photo CD as well as a CD-ROM, which can store a large amount of text, graphics, photographs, audio, and video,
- display audio through high-end stereo speakers,
- allow its user to communicate verbally with and physically watch another computer user located somewhere in the world through modems and networking software, and
- display digital movies, which can be imported from a videotape, a CD-ROM, or a television set.

The primary function of the multimedia-based computer is to deliver instruction which accommodates a diversity of learning styles (Heinich, Molenda & Russell, 1993). A learner receiving instruction via multimedia is exposed to a variety of textual, graphical, audio, video, photographic, or animated information. In contrast, a learner receiving traditional instruction is less likely to be exposed to such an informational diversity.

Computers and Learner Motivation

Variation in the instructional approach has proved to heighten the motivational level of learners. Yang (1992) reports that learners exposed to computer-based instruction demonstrated high levels of motivation and positive attitudes toward learning. But, what is meant by motivation? What motivates a learner? And how does a motivated learner differ from a nonmotivated one?

Motivation, according to Schunk (1991), "is the process whereby people set goals and engage in cognitive activities (e.g., monitor goal progress) and behaviors (e.g., expend efforts) to attain their goals." Motivation cannot be directly observed; however, it can be inferred from people's statements, choice of action, effort expenditure, and task persistence.

Schunk postulates that learners are either intrinsically or extrinsically motivated. Intrinsically motivated learners exert effort simply for the inherent pleasure of the learning task itself. Thus, the learning task is selected and participated in merely for the pleasure it generates and is perceived as the desired end. On the other hand, extrinsically motivated learners view the learning task as a means to obtain a reward or to avoid punishment. Therefore, the completion of the task serves as the means to earn the desired extrinsic reward or avoid the punishment.

The difference between motivated and nonmotivated learners is that motivated learners, whether they were intrinsically or extrinsically motivated, are more likely to;

- exert greater effort on the task,

- choose to work on the task voluntarily,
- spend more time engaging with the task,
- learn faster,
- have high outcome expectations, and
- persist longer in the face of task difficulties.

However, research studies (Newby & Alter, 1989) indicate that intrinsically motivated learners remain engaged longer in the task and demonstrate a stronger persistence in the face of task difficulties with no thought of external rewards, since they reward themselves. In what follows, a number of studies will be reviewed to illustrate how computers have effectively helped motivate learners intrinsically.

In one study, Rieber (1991) examined the effects of computer animated presentations on intentional and incidental learning and how these presentations contained intrinsically motivating features, as measured by continuing motivation. One of the study's objectives was to investigate whether computer animations hold intrinsically motivating features for learners. Learners choosing to return to engage in the learning task in a free-choice situation was used as a measure of their motivation and continuing motivation.

The 70 fourth-grade subjects in this study were taught a lesson on Newton's laws of motion. Subjects were exposed to two kinds of visual presentations: static graphics and animated graphics. Both kinds of visual presentations elaborated the textual information of the lesson.

Results showed that subjects overwhelmingly chose to return to engage with the computer animated graphics when placed in a free-choice situation. These results support one of the study's hypotheses that the computer animated visuals hold intrinsically motivating appeal for learners. Rieber pointed out that this appeal led learners to maintain interest and choose to stay on the task for longer periods of time and in meaningful ways.

In another study, Fredrickson (1990) described the instructional, motivational, and communicational roles of audiographics–a system comprising of computer graphics, telephone communications systems, and teaching strategies. In this study, Fredrickson reported the positive effects of audiographics on the motivational levels, attitude levels, and quality of learning of both high school and college students.

According to Fredrickson, a teacher, through audiographics, can create instructional visual images and send them to computers at remote sites to be stored. That teacher can connect with others (students or other teachers) at the remote sites whenever needed through telephone lines, an audio-bridge, and modems. This connection capability enables teachers and students to interact with each other as they do in a traditional classroom. The teacher-student video interaction is carried out through the computers, while the audio message is transmitted through the speakerphones. For illustration purposes, a teacher can display a visual image on all of the monitors (at different sites) at once. Students at the other sites can manipulate (draw or write on) the displayed image in response to a question or to demonstrate knowledge.

Describing the positive effects of audiographics, Fredrickson reported that learners' motivational, as well as attitudinal levels, improved significantly. Fredrickson explained that learners enrolled in an audiographics course did not wish to be seen unprepared for class. They

knew that through the teacher-student (or even student-student) video interaction, it was very noticeable when one had not prepared well for class, which caused them to be extrinsically motivated to be prepared. Fredrickson also added that, by having information presented visually on the monitor and discussed verbally, different learning styles were be being fulfilled. As a result of this technical, instructional capability, learners became more intrinsically motivated toward their learning. For Fredrickson, audiographics is the most effective, efficient, and motivation enhancing computer-based distance education system currently available.

Another study was conducted to investigate the effects of humorous computer visuals on learning and learners' attitudes. In this study, Snetsinger and Grabowski (1994) hypothesized that incorporating a humorous theme and cartoons associated with humorous comments to support the content helps motivate learners to attend to and retain computer-based instructional materials better than materials presented in a standard, nonhumorous way.

Subjects were college students divided into three groups. One group of 43 students received a computer-based lesson, entitled "Anatomy of the Hard Tick". This lesson included a humorous theme and cartoons, and humorous comments related to the content. Humor in this study used a theme that was ridiculous, exaggerated, and informal, and included occasional mnemonics. A second group of 32 students received the same lesson without the inclusion of humor. A third group of 40 students served as a control group.

Results indicated that there were no significant differences in learning and retention between the two treatment groups. The authors of this study interpreted this as meaning that the scientific, sequential use of computer graphics was meaningful enough to produce positive effects even without the use of humor. However, the results did indicate that with the group receiving the humorous treatment, there were outer expressions of amusement, such as smiles and laughs. Results also indicated that humor did have an affective impact in that the humor group was more worried by the dangers of ticks and tick-borne diseases. The authors theorized that this was the result of the dramatic reinforcement of the content.

Motivation-Enhancing Guidelines

Based on the literature (Keller, 1983, 1988, 1993; Rieber, 1994; Malone, 1981) regarding computer visual appeal, several guidelines should be considered for the design of computer-appealing features (CAF's) that enhance motivation:

- Provide CAF's that adequately support the needs of learners, content, and the nature of the learning task.
- Provide CAF's that increase learners' motivation and interest rather than distract them.
- Change the presentation and frequency of CAF's to stimulate learners' attention and curiosity.
- Provide CAF's that provoke mental conflict to stimulate epistemic curiosity.
- Provide CAF's that include the elements of novelty, surprise, and drama to pique learners' curiosity.
- Provide CAF's that trigger learners' fantasy and imaginations.
- Provide CAF's that stimulate an attitude of inquiry.
- Place CAF's strategically throughout the content.
- Use CAF's to direct learners' attention to the key points within the content.

- Relate CAF's to learners' existing knowledge and skills.
- Use CAF's as analogies to connect the content to concepts and skills already familiar to learners.
- Provide CAF's that can be related to meaningful goals in learners' future.
- Include a challenge element in the design of CAF's to produce an appropriate expectancy for success.
- Provide CAF's that increase learners' confidence by giving them adequate guidance.
- Include learner options in the design of CAF's to promote an internal sense of control on the part of learners.
- Provide CAF's that resemble the real world application of the content to produce a perception of natural consequences.
- Use CAF's to provide feedback regarding learners' performance.
- Include CAF's that make the content easier to interpret and use in order to maintain attention and build confidence.
- Provide CAF's that include people to gain and maintain learners' attention.

References

Fredrickson, S. (1990, March). Audiographics for distance education: An alternative technology. Paper presented at the Annual Conference of the Alaska Association for Computers in Education, Alaska.

Heinich, R., Molenda, M., & Russell, J. (1993). Instructional media: And the new technologies of instruction. New York: Macmillan Publishing Company.

Keller, J. & Burkman, E. (1993). Motivation principles. In M. Fleming & Levie, W. (Eds.), Instructional message design (pp. 3-53). Englewood Cliffs, NJ: Educational Technology Publications.

Keller, J. & Suzuki, K. (1988). Use of the ARCS motivation model in courseware design. In D. Jonassen (Ed.), Instructional designs for microcomputer courseware (pp. 401-434). Hillsdale, NJ: Lawrence Erlbaum Associates.

Keller, J. M. (1983). Use of the ARCS model of motivation in teacher training. Syracuse University, School of Education, New York.

Lockard, J. A., Abrams, P. D., & Many, W. A. (1987). Microcomputers for educators. Boston, MA: Little, Brown and Company.

Malone, T. (1981). Toward a theory of intrinsically motivating instruction. Cognitive Science, 4, 333-369.

Newby, T. & Alter, P. (1989). Task motivation: Learner selection of intrinsic versus extrinsic orientations. Educational Technology, Research and Development, 37, 77-90.

Rieber, L. (1991). Animation, incidental learning, and continuing motivation. Journal of Educational Psychology, 83, 318-328.

Rieber, L. (1994). Computers, graphics, and Learning. Madison, WI: WCB Brown & Benchmark.

Saettler, P. (1990). The evolution of American educational technology.

Schunk, D. H. (1991). Learning theories: An educational perspective. New York: Macmillan Publishing Company.

Snetsinger, W. & Grabowski, B. (1994). Use of humorous visuals to enhance

computer-based instruction. Proceedings of the 25th Annual Conference of the International Visual Literacy Association, 262-270.

Toffler, A. (Ed.). (1974). Learning for tomorrow: The role of the future in education. New York: Vintage Books.

Viau, E. (1994). The mind as a channel: A paradigm for the information age. Educational Technology Review, 3, 5-10.

Yang, Y. (1992). The effects of media on motivation and content recall: Comparison of computer- and print-based instruction. Educational Technology Systems, 20, 95-105.